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CANCEL CLAIMS 1 AND 2

3. A method for use in conjunction with a C-arm imaging apparatus, for visual servoing of a needle in a plane in a fixed number of iterations, with: a given position of said C-arm being modeled on an image plane, a given target point for needle biopsy, a given entry point on a patient, and a given plane within which said needle can rotate around said given entry point, said method comprising:

placing said needle in an arbitrary orientation around said given entry point, said orientation being associated with an angle $\theta 1$ with respect to an arbitrary reference direction;

obtaining a 2-dimensional (2-D) projection image of said needle in said image plane;

measuring the position I1 of said 2-D projection image;

rotating said needle around said entry point by an angle $\Delta\theta$ to a position $(\theta 1 + \Delta\theta)$ in said given plane;

measuring the position I2 of said 2-D projection image;

rotating said needle around said entry point by an angle $\Delta\theta$ to a position $\theta 3 = (\theta 1 + 2^{*}\Delta\theta)$;

measuring the position I3 of said 2-D projection image;

locating 2-D points f and t in said 2-D projection image that are the respective 2-D projections of said target point and said entry point, said points f and t defining an image line lt = (ft);

calculating the cross-ratio c = (I1, I2, I3, lt);

determining a 3-D angle θt such that $c = (\theta 1, \theta 2, \theta 3, \theta t)$; and termining a 3-D angle θt such that $c = (\theta 1, \theta 2, \theta 3, \theta t)$; and

rotating said needle around said entry point by θt from position $\theta 3$ in said given plane, whereby said needle is positioned in three dimensional space at said entry point along a direction such that said needle is visually aligned to 2-D projection image of said target in said image plane.

4. A method for visual servoing of a needle in a plane in a fixed number of iterations as recited in claim 3, wherein said step of locating 2-D points f and t is performed automatically.

5. A method for visual servoing of a needle in a plane in a fixed number of iterations as recited in claim 3, wherein said step of locating 2-D points f and t is performed manually.

CANCEL CLAIMS 6-10